

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

(Investigation 332-392)

ADVICE CONCERNING APEC SECTORAL TRADE LIBERALIZATION

AGENCY: United States International Trade Commission

ACTION: Institution of investigation and scheduling of public hearing.

EFFECTIVE DATE: March 25, 1998

SUMMARY: Following receipt of a request on March 18, 1998, from the U.S. Trade Representative (USTR), the Commission instituted investigation No. 332-392, *Advice Concerning APEC Sectoral Trade Liberalization*, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)).

FOR FURTHER INFORMATION: Industry-specific information may be obtained from Karen Laney-Cummings (202-205-3443) or James Lukes (202-205-3426), Office of Industries, U.S. International Trade Commission, Washington, DC 20436. For information on the legal aspects of this investigation contact Mr. William Gearhart of the Office of the General Counsel (202-205-3091). News media should contact Peg O'Laughlin, Office of External Relations (202-205-1819). Hearing impaired individuals are advised that information on this matter can be obtained by contacting the TDD terminal on (202) 205-1810.

BACKGROUND: USTR asked the Commission to provide advice concerning trade liberalization among APEC countries in nine sectors including: chemicals, environmental goods and services, fish and fish products, forest products, gems and jewelry, medical equipment and instruments, toys, energy equipment and services, and telecommunications equipment. A list of Harmonized Tariff System (HTS) numbers that comprise the goods for most sectors is attached; the list for environmental goods and services is illustrative. The report will include (1) profiles of the above industry sectors (including a description of U.S. and foreign sectors and their competitive positions); (2) an assessment of patterns of U.S. sector imports and exports to APEC trading partners and other trading partners; (3) summaries of U.S. and foreign tariff rates and reported nontariff barriers affecting the sectors; and (4) information about increased market access opportunities resulting from liberalization.

As requested, the Commission plans to transmit its report to USTR by June 16, 1998. USTR has indicated portions of the report will be classified as "confidential" and will also be regarded as containing predecisional advice and be subject to the deliberative process privilege.

PUBLIC HEARING: A public hearing in connection with the investigation will be held at the U.S. International Trade Commission Building, 500 E Street SW, Washington, DC, beginning at 9:30 a.m. on April 21, 1998. All persons shall have the right to appear, by counsel or in person, to present information and to be heard. Requests to appear at the public hearing should be filed with the Secretary, U.S. International Trade Commission, 500 E Street SW, Washington, DC, 20436, no later than 5:15 p.m., April 15, 1998. Any prehearing briefs (original and 14 copies) should be filed not later than 5:15 p.m., April 15, 1998; the deadline for filing post-hearing briefs or statements is 5:15 p.m., April 28, 1998. In the event that, as of the close of business on April 15, 1998, no witnesses are scheduled to appear at the

hearing, the hearing will be canceled. Any person interested in attending the hearing as an observer or non-participant may call the Secretary to the Commission (202-205-1816) after April 15, 1998 to determine whether the hearing will be held.

WRITTEN SUBMISSIONS: In lieu of, or in addition to, participating in the hearing, interested parties are invited to submit written statements concerning the matters to be addressed by the Commission in its report on this investigation. Commercial or financial information that a submitter desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of section 201.6 of the Commission's Rules of Practice and Procedure (19 C.F.R. 201.6). All written submissions, except for confidential business information, will be made available in the Office of the Secretary to the Commission for inspection by interested parties. To be assured of consideration by the Commission, written statements relating to the Commission's report should be submitted to the Commission at the earliest practical date and should be received no later than 5:15 p.m. on April 28, 1998. All submissions should be addressed to the Secretary, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436.

Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server (<http://www.usitc.gov>).

LIST OF SUBJECTS: APEC, trade liberalization, tariff rates, nontariff barriers, market access opportunities, chemicals, environmental goods and services, fish and fish products, forest products, gems and jewelry, medical equipment and instruments, toys, energy equipment and services, and telecommunications equipment.

By order of the Commission.

Donna R. Koehnke
Secretary

Issued: March 26, 1998

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

(Investigation 332-392)

ADVICE CONCERNING APEC SECTORAL TRADE LIBERALIZATION

Sector Coverage for Tariff Data

Chemicals:

2801.10	2815.11	2827.33	2835.10	2842.10	2903.11
2801.20	2815.12	2827.34	2835.22	2842.90	2903.12
2801.30	2815.20	2827.35	2835.23	2843.10	2903.13
2802.00	2815.30	2827.36	2835.24	2843.21	2903.14
2803.00	2816.10	2827.38	2835.25	2843.29	2903.15
2804.10	2816.20	2827.39	2835.26	2843.30	2903.16
2804.21	2816.30	2827.41	2835.29	2843.90	2903.19
2804.29	2817.00	2827.49	2835.31	2844.10	2903.21
2804.30	2818.10	2827.51	2835.39	2844.20	2903.22
2804.40	2818.20	2827.59	2836.10	2844.30	2903.23
2804.50	2818.30	2827.60	2836.20	2844.40	2903.29
2804.61	2819.10	2828.10	2836.30	2844.50	2903.30
2804.69	2819.90	2828.90	2836.40	2845.10	2903.41
2804.70	2820.10	2829.11	2836.50	2845.90	2903.42
2804.80	2820.90	2829.19	2836.60	2846.10	2903.43
2804.90	2821.10	2829.90	2836.70	2846.90	2903.44
2805.11	2821.20	2830.10	2836.91	2847.00	2903.45
2805.19	2822.00	2830.20	2836.92	2848.00	2903.46
2805.21	2823.00	2830.30	2836.99	2849.10	2903.47
2805.22	2824.10	2830.90	2837.11	2849.20	2903.49
2805.30	2824.20	2831.10	2837.19	2849.90	2903.51
2805.40	2824.90	2831.90	2837.20	2850.00	2903.59
2806.10	2825.10	2832.10	2838.00	2851.00	2903.61
2806.20	2825.20	2832.20	2839.11	2901.10	2903.62
2807.00	2825.30	2832.30	2839.19	2901.21	2903.69
2808.00	2825.40	2833.11	2839.20	2901.22	2904.10
2809.10	2825.50	2833.19	2839.90	2901.23	2904.20
2809.20	2825.60	2833.21	2840.11	2901.24	2904.90
2810.00	2825.70	2833.22	2840.19	2901.29	2905.11
2811.11	2825.80	2833.23	2840.20	2902.11	2905.12
2811.19	2825.90	2833.24	2840.30	2902.19	2905.13
2811.21	2826.11	2833.25	2841.10	2902.20	2905.14
2811.22	2826.12	2833.26	2841.20	2902.30	2905.15
2811.23	2826.19	2833.27	2841.30	2902.41	2905.16
2811.29	2826.20	2833.29	2841.40	2902.42	2905.17
2812.10	2826.30	2833.30	2841.50	2902.43	2905.19
2812.90	2826.90	2833.40	2841.61	2902.44	2905.22
2813.10	2827.10	2834.10	2841.69	2902.50	2905.29
2813.90	2827.20	2834.21	2841.70	2902.60	2905.31
2814.10	2827.31	2834.22	2841.80	2902.70	2905.32
2814.20	2827.32	2834.29	2841.90	2902.90	2905.39

2905.41	2912.12	2915.60	2919.00	2926.90	2936.21
2905.42	2912.13	2915.70	2920.10	2927.00	2936.22
2905.45	2912.19	2915.90	2920.90	2928.00	2936.23
2905.49	2912.21	2916.11	2921.11	2929.10	2936.24
2905.50	2912.29	2916.12	2921.12	2929.90	2936.25
2906.11	2912.30	2916.13	2921.19	2930.10	2936.26
2906.12	2912.41	2916.14	2921.21	2930.20	2936.27
2906.13	2912.42	2916.15	2921.22	2930.30	2936.28
2906.14	2912.49	2916.19	2921.29	2930.40	2936.29
2906.19	2912.50	2916.20	2921.30	2930.90	2936.90
2906.21	2912.60	2916.31	2921.41	2931.00	2937.10
2906.29	2913.00	2916.32	2921.42	2932.11	2937.21
2907.11	2914.11	2916.34	2921.43	2932.12	2937.22
2907.12	2914.12	2916.35	2921.44	2932.13	2937.29
2907.13	2914.13	2916.39	2921.45	2932.19	2937.91
2907.14	2914.19	2917.11	2921.49	2932.21	2937.92
2907.15	2914.21	2917.12	2921.51	2932.29	2937.99
2907.19	2914.22	2917.13	2921.59	2932.91	2938.10
2907.21	2914.23	2917.14	2922.11	2932.92	2938.90
2907.22	2914.29	2917.19	2922.12	2932.93	2939.10
2907.23	2914.31	2917.20	2922.13	2932.94	2939.21
2907.29	2914.39	2917.31	2922.19	2932.99	2939.29
2907.30	2914.40	2917.32	2922.21	2933.11	2939.30
2908.10	2914.50	2917.33	2922.22	2933.19	2939.41
2908.20	2914.61	2917.34	2922.29	2933.21	2939.42
2908.90	2914.69	2917.35	2922.30	2933.29	2939.49
2909.11	2914.70	2917.36	2922.41	2933.31	2939.50
2909.19	2915.11	2917.37	2922.42	2933.32	2939.61
2909.20	2915.12	2917.39	2922.43	2933.39	2939.62
2909.30	2915.13	2918.11	2922.49	2933.40	2939.63
2909.41	2915.21	2918.12	2922.50	2933.51	2939.69
2909.42	2915.22	2918.13	2923.10	2933.59	2939.70
2909.43	2915.23	2918.14	2923.20	2933.61	2939.90
2909.44	2915.24	2918.15	2923.90	2933.69	2940.00
2909.49	2915.29	2918.16	2924.10	2933.71	2941.10
2909.50	2915.31	2918.17	2924.21	2933.79	2941.20
2909.60	2915.32	2918.19	2924.22	2933.90	2941.30
2910.10	2915.33	2918.21	2924.29	2934.10	2941.40
2910.20	2915.34	2918.22	2925.11	2934.20	2941.50
2910.30	2915.35	2918.23	2925.19	2934.30	2941.90
2910.90	2915.39	2918.29	2925.20	2934.90	2942.00
2911.00	2915.40	2918.30	2926.10	2935.00	3001.10
2912.11	2915.50	2918.90	2926.20	2936.10	3001.20

3001.90	3104.30	3209.10	3403.11	3702.53	3809.93
3002.10	3104.90	3209.90	3403.19	3702.54	3810.10
3002.20	3105.10	3210.00	3403.91	3702.55	3810.90
3002.30	3105.20	3211.00	3403.99	3702.56	3811.11
3002.90	3105.30	3212.10	3404.10	3702.91	3811.19
3003.10	3105.40	3212.90	3404.20	3702.92	3811.21
3003.20	3105.51	3213.10	3404.90	3702.93	3811.29
3003.31	3105.59	3213.90	3405.10	3702.94	3811.90
3003.39	3105.60	3214.10	3405.20	3702.95	3812.10
3003.40	3105.90	3214.90	3405.30	3703.10	3812.20
3003.90	3201.10	3215.11	3405.40	3703.20	3812.30
3004.10	3201.20	3215.19	3405.90	3703.90	3813.00
3004.20	3201.90	3215.90	3406.00	3704.00	3814.00
3004.31	3202.10	3302.10	3407.00	3705.10	3815.11
3004.32	3202.90	3302.90	3506.10	3705.20	3815.12
3004.39	3203.00	3303.00	3506.91	3705.90	3815.19
3004.40	3204.11	3304.10	3506.99	3706.10	3815.90
3004.50	3204.12	3304.20	3507.10	3706.90	3816.00
3004.90	3204.13	3304.30	3507.90	3707.10	3817.10
3005.10	3204.14	3304.91	3601.00	3707.90	3817.20
3005.90	3204.15	3304.99	3602.00	3801.10	3818.00
3006.10	3204.16	3305.10	3603.00	3801.20	3819.00
3006.20	3204.17	3305.20	3604.10	3801.30	3820.00
3006.30	3204.19	3305.30	3604.90	3801.90	3821.00
3006.40	3204.20	3305.90	3605.00	3802.10	3822.00
3006.50	3204.90	3306.10	3606.10	3802.90	3823.11
3006.60	3205.00	3306.20	3606.90	3803.00	3823.12
3101.00	3206.11	3306.90	3701.10	3804.00	3823.13
3102.10	3206.19	3307.10	3701.20	3805.10	3823.19
3102.21	3206.20	3307.20	3701.30	3805.20	3823.70
3102.29	3206.30	3307.30	3701.91	3805.90	3824.10
3102.30	3206.41	3307.41	3701.99	3806.10	3824.20
3102.40	3206.42	3307.49	3702.10	3806.20	3824.30
3102.50	3206.43	3307.90	3702.20	3806.30	3824.40
3102.60	3206.49	3401.11	3702.31	3806.90	3824.50
3102.70	3206.50	3401.19	3702.32	3807.00	3824.60
3102.80	3207.10	3401.20	3702.39	3808.10	3824.71
3102.90	3207.20	3402.11	3702.41	3808.20	3824.79
3103.10	3207.30	3402.12	3702.42	3808.30	3824.90
3103.20	3207.40	3402.13	3702.43	3808.40	3901.10
3103.90	3208.10	3402.19	3702.44	3808.90	3901.20
3104.10	3208.20	3402.20	3702.51	3809.91	3901.30
3104.20	3208.90	3402.90	3702.52	3809.92	3901.90

3902.10	3905.29	3910.00	3917.22	3920.62	3922.90
3902.20	3905.30	3911.10	3917.23	3920.63	3923.10
3902.30	3905.91	3911.90	3917.29	3920.69	3923.21
3902.90	3905.99	3912.11	3917.31	3920.71	3923.29
3903.11	3906.10	3912.12	3917.32	3920.72	3923.30
3903.19	3906.90	3912.20	3917.33	3920.73	3923.40
3903.20	3907.10	3912.31	3917.39	3920.79	3923.50
3903.30	3907.20	3912.39	3917.40	3920.91	3923.90
3903.90	3907.30	3912.90	3918.10	3920.92	3924.10
3904.10	3907.40	3913.10	3918.90	3920.93	3924.90
3904.21	3907.50	3913.90	3919.10	3920.94	3925.10
3904.22	3907.60	3914.00	3919.90	3920.99	3925.20
3904.30	3907.91	3915.10	3920.10	3921.11	3925.30
3904.40	3907.99	3915.20	3920.20	3921.12	3925.90
3904.50	3908.10	3915.30	3920.30	3921.13	3926.10
3904.61	3908.90	3915.90	3920.41	3921.14	3926.20
3904.69	3909.10	3916.10	3920.42	3921.19	3926.30
3904.90	3909.20	3916.20	3920.51	3921.90	3926.40
3905.12	3909.30	3916.90	3920.59	3922.10	3926.90
3905.19	3909.40	3917.10	3920.61	3922.20	
3905.21	3909.50	3917.21			

Fish and fish products:

0301.10	0302.61	0303.43	0305.20	0306.23	1504.10
0301.91	0302.62	0303.49	0305.30	0306.24	1504.20
0301.92	0302.63	0303.50	0305.41	0306.29	1504.30
0301.93	0302.64	0303.60	0305.42	0307.10	1603.00
0301.99	0302.65	0303.71	0305.49	0307.21	1604.11
0302.11	0302.66	0303.72	0305.51	0307.29	1604.12
0302.12	0302.69	0303.73	0305.59	0307.31	1604.13
0302.19	0302.70	0303.74	0305.61	0307.39	1604.14
0302.21	0303.10	0303.75	0305.62	0307.41	1604.15
0302.22	0303.21	0303.76	0305.63	0307.49	1604.16
0302.23	0303.22	0303.77	0305.69	0307.51	1604.19
0302.29	0303.29	0303.78	0306.11	0307.59	1604.20
0302.31	0303.31	0303.79	0306.12	0307.60	1604.30
0302.32	0303.32	0303.80	0306.13	0307.91	1605.10
0302.33	0303.33	0304.10	0306.14	0307.99	1605.20
0302.39	0303.39	0304.20	0306.19	0511.10	1605.30
0302.40	0303.41	0304.90	0306.21	0511.91	1605.40
0302.50	0303.42	0305.10	0306.22	0511.99	1605.90

2301.10
2301.20
2309.10
2309.90

Forest products:

4401.10	4411.19	4601.91	4804.19	4810.11	4818.40
4401.21	4411.21	4601.99	4804.21	4810.12	4818.50
4401.22	4411.29	4602.10	4804.29	4810.21	4818.90
4401.30	4411.31	4602.90	4804.31	4810.29	4819.10
4402.00	4411.39	4701.00	4804.39	4810.31	4819.20
4403.10	4411.91	4702.00	4804.41	4810.32	4819.30
4403.20	4411.99	4703.11	4804.42	4810.39	4819.40
4403.41	4412.13	4703.19	4804.49	4810.91	4819.50
4403.49	4412.14	4703.21	4804.51	4810.99	4819.60
4403.91	4412.19	4703.29	4804.52	4811.10	4820.10
4403.92	4412.22	4704.11	4804.59	4811.21	4820.20
4403.99	4412.23	4704.19	4805.10	4811.29	4820.30
4404.10	4412.29	4704.21	4805.21	4811.31	4820.40
4404.20	4412.92	4704.29	4805.22	4811.39	4820.50
4405.00	4412.93	4705.00	4805.23	4811.40	4820.90
4406.10	4412.99	4706.10	4805.29	4811.90	4821.10
4406.90	4413.00	4706.20	4805.30	4812.00	4821.90
4407.10	4414.00	4706.91	4805.40	4813.10	4822.10
4407.24	4415.10	4706.92	4805.50	4813.20	4822.90
4407.25	4415.20	4706.93	4805.60	4813.90	4823.11
4407.26	4416.00	4707.10	4805.70	4814.10	4823.19
4407.29	4417.00	4707.20	4805.80	4814.20	4823.20
4407.91	4418.10	4707.30	4806.10	4814.30	4823.40
4407.92	4418.20	4707.90	4806.20	4814.90	4823.51
4407.99	4418.30	4801.00	4806.30	4815.00	4823.59
4408.10	4418.40	4802.10	4806.40	4816.10	4823.60
4408.31	4418.50	4802.20	4807.10	4816.20	4823.70
4408.39	4418.90	4802.30	4807.90	4816.30	4823.90
4408.90	4419.00	4802.40	4808.10	4816.90	4901.10
4409.10	4420.10	4802.51	4808.20	4817.10	4901.91
4409.20	4420.90	4802.52	4808.30	4817.20	4901.99
4410.11	4421.10	4802.53	4808.90	4817.30	4902.10
4410.19	4421.90	4802.60	4809.10	4818.10	4902.90
4410.90	4601.10	4803.00	4809.20	4818.20	4903.00
4411.11	4601.20	4804.11	4809.90	4818.30	4904.00

4905.10
 4905.91
 4905.99
 4906.00
 4907.00
 4908.10
 4908.90
 4909.00
 4910.00
 4911.10
 4911.91
 4911.99
 9401.30
 9401.50
 9401.61
 9401.69
 9401.80
 9401.90
 9403.30
 9403.40
 9403.50
 9403.60
 9403.80
 9403.90
 9406.00

Gems and jewelry:

7101.10	7103.91	7106.92	7110.29	7113.11	7116.10
7101.21	7103.99	7107.00	7110.31	7113.19	7116.20
7101.22	7104.10	7108.11	7110.39	7113.20	7117.11
7102.10	7104.20	7108.12	7110.41	7114.11	7117.19
7102.21	7104.90	7108.13	7110.49	7114.19	7117.90
7102.29	7105.10	7109.00	7111.00	7114.20	7118.10
7102.31	7105.90	7110.11	7112.10	7115.10	7118.90
7102.39	7106.10	7110.19	7112.20	7115.90	
7103.10	7106.91	7110.21	7112.90		

Medical equipment and instruments:

2844.40	9018.32	9021.50	9025.11	9027.90	9030.90
3822.00	9018.39	9021.90	9025.19	9028.10	9031.10
8419.20	9018.41	9022.12	9025.80	9028.20	9031.20
8543.89	9018.49	9022.13	9025.90	9028.30	9031.30
8713.10	9018.50	9022.14	9026.10	9028.90	9031.41
8713.90	9018.90	9022.19	9026.20	9030.10	9031.49
8714.20	9019.10	9022.21	9026.80	9030.20	9031.80
9018.11	9019.20	9022.29	9026.90	9030.31	9031.90
9018.12	9021.11	9022.30	9027.10	9030.39	9032.10
9018.13	9021.19	9022.90	9027.20	9030.40	9032.20
9018.14	9021.21	9023.00	9027.30	9030.82	9032.81
9018.19	9021.29	9024.10	9027.40	9030.83	9032.89
9018.20	9021.30	9024.80	9027.50	9030.89	9032.90
9018.31	9021.40	9024.90	9027.80		

Toys:

9501.00	9503.10	9503.49	9503.80	9504.30	9505.10
9502.10	9503.20	9503.50	9503.90	9504.40	9505.90
9502.91	9503.30	9503.60	9504.10	9504.90	
9502.99	9503.41	9503.70	9504.20		

Telecommunications:

8517.11	8517.22	8517.80	8520.10	8525.20	8526.92
8517.19	8517.30	8517.90	8520.20	8527.90	
8517.21	8517.50				

ENERGY COMMODITIES

<u>HS</u>	<u>DESCRIPTION</u>
2701.11	Anthracite coal, not agglomerated
2701.12	Bituminous coal, not agglomerated
2701.19	Coal nesoi, not agglomerated
2701.20	Briquettes, ovoids, similar solid fuels from coal
2711.11	Natural gas, liquefied
2711.12	Propane, liquefied
2711.13	Butanes, liquefied
2711.14	Ethylene, propylene, butylene and butadiene liquifi
2711.19	Petroleum gases etc., liquified, nesoi
2711.21	Natural gas, gaseous
2711.29	Petroleum gases etc., in gaseous state, nesoi
2716.00	Electrical energy
ex 2901.10	Synthetic natural gas (methane of 90% purity obtained from sources other than naturally occuring reservoirs of natural gas)

ENERGY-RELATED EQUIPMENT

EX	HS 98	6-Digit Description
	7304 10	Line pipe of a kind used for oil or gas pipelines
	7304 21	Drill pipe of a kind used in drilling for oil and gas
	7304 29	Casing or tubing of a kind used in drilling for oil and gas
ex	7304 31	Seamless cold-drawn or cold-rolled tubes, pipes, and hollow profiles, of iron or nonalloy steel, other than of circular cross section, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces and feedwater heaters
ex	7304 39	Tubes, pipes, and hollow profiles, seamless, of iron or nonalloy steel, other than cold-drawn or cold-rolled, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces and feedwater heaters
ex	7304 41	Tubes, pipes, and hollow profiles, seamless, of cold-rolled or cold-drawn, of stainless steel other than of high-nickel alloy steel, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces, and feedwater heaters
ex	7304 49	Tubes, pipes, and hollow profiles, seamless, other than cold-rolled or cold-drawn, of stainless steel other than of high-nickel alloy steel, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces, and feedwater heaters
ex	7304 51	Tubes, pipes, and hollow profiles, seamless, of circular cross section, of other alloy steel, cold-rolled or cold-drawn, other than of high-nickel alloy steel, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces, and feedwater heaters
ex	7304 59	Tubes, pipes, and hollow profiles, seamless of iron or steel, of circular cross-section, of other alloy steel, other than cold-rolled or cold-drawn for use in boilers, superheaters, heat exchangers, condensers, refining furnaces, and feedwater heaters
	7305 11	Line pipe of a kind used for oil and gas pipelines, longitudinally submerged arc welded, having circular cross sections, the external diameter of which exceeds 406.4 mm
	7305 12	Line pipe of a kind used for oil and gas pipelines, other longitudinally welded, having circular cross sections, the external diameter of which exceeds 406.4 mm
	7305 19	Line pipe of a kind used for oil and gas pipelines, other than longitudinally welded, having circular cross sections, the external diameter of which exceeds 406.4 mm
	7305 20	Casing of a kind used in oil or gas drilling, having circular cross sections, the external diameter of which exceeds 406.4 mm
	7306 10	Line pipe of a kind used for oil or gas pipelines, open seamed, or welded, riveted or similarly closed
	7306 20	Casing or tubing of a kind used in oil or gas drilling, open seamed, welded, riveted or similarly closed

- ex 7306 30 Tubes, pipes, and hollow profiles, welded, of circular cross section, of iron or nonalloy steel, having a wall thickness of 1.65mm or more, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces and feedwater heaters, whether or not cold drawn
- ex 7306 40 Tubes, pipes, and hollow profiles, welded, of circular cross section, of stainless steel, having a wall thickness of 1.65mm or more, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces and feedwater heaters, whether or not cold drawn
- ex 7306 50 Tubes, pipes, and hollow profiles, welded, of circular cross section, of other alloy steel nonalloy steel, having a wall thickness of 1.65mm or more, suitable for use in boilers, superheaters, heat exchangers, condensers, refining furnaces and feedwater heaters, whether or not cold drawn
- ex 7308 20 Towers and lattice masts of iron or steel for oil or gas exploration and extraction and electricity power transmission
- ex 7308 40 Equipment for scaffolding, shuttering, propping or pit-propping for coal and uranium mining
- ex 7308 90 Parts of towers and lattice masts of iron or steel for oil or gas exploration and extraction and electricity power transmission
- ex 7309 00 Reservoirs, tanks, vats, and similar containers, of iron or steel, of a capacity exceeding 300 liters, whether or not lined or heat insulated, but not fitted with mechanical or thermal equipment for use with petroleum extraction, production, and refining
- ex 7310 10 Empty steel drums and barrels of a capacity greater than 50 liters for use with petroleum or refined petroleum products
- 7311 00 Containers for compressed or liquefied gas, of iron or steel, for the storage of natural gas
- ex 7312 10 Steel wire cables for the core of aluminum cable-steel reinforced cables (ACSR)
- 8207 13 Rock drilling or earth boring tools, and parts thereof, with a working part of cermets
- 8207 19 Rock drilling or earth boring tools, and parts thereof, with a working part other than cermet
- 8401 10 Nuclear reactors
- 8401 20 Machinery and apparatus for isotopic separation, and parts thereof
- 8401 30 Fuel elements (cartridges), non-irradiated, and parts thereof
- 8401 40 Parts of nuclear reactors
- 8402 11 Watertube boilers with a steam production exceeding 45 t per hour

- 8402 12 Watertube boilers with a steam production not exceeding 45 t per hour
- 8402 19 Other vapor generating boilers, including hybrid boilers
- 8402 20 Super-heated water boilers
- 8402 90 Parts of steam or other vapor-generating boilers of heading 8404
- 8403 10 Central heating boilers (other than those of 8402)
- 8403 90 Parts of central heating boilers (other than those of 8402)
- 8404 10 Auxiliary plant for use with boilers of headings 8402 and 8403
- 8404 20 Condensers for steam and other vapor power units of headings 8402 and 8403
- 8404 90 Parts of auxiliary plant for use with boilers of headings 8402 and 8403
- 8406 81 Steam and other vapor turbines of an output exceeding 40 MW
- ex 8406 82 Steam and other vapor turbines of an output not exceeding 40 MW
- ex 8406 90 Parts of steam and other vapor turbines other than for marine propulsion
- ex 8408 90 Other compression-ignition internal combustion piston engines (diesel or semi-diesel engines) for use in drilling for oil and gas
- ex 8409 99 Parts of other compression-ignition internal combustion piston engines (diesel or semi-diesel engines) for use in drilling for oil and gas
- 8410 11 Hydraulic turbines and water wheels of a power not exceeding 1,000 kW_r
- 8410 12 Hydraulic turbines and water wheels of a power exceeding 1,000 kW but not exceeding 10,000 kW
- 8410 13 Hydraulic turbines and water wheels of a power exceeding 10,000 kW
- 8410 90 Parts, including regulators
- ex 8411 11 Turbojets of a thrust not exceeding 25 kN other than for aircraft, marine craft and locomotives
- ex 8411 12 Turbojets of a thrust exceeding 25 kN other than for aircraft, marine craft and locomotives
- ex 8411 21 Turbopropellers of a power not exceeding 1,100 kW other than for aircraft, marine craft and locomotives
- ex 8411 22 Turbopropellers of a power exceeding 1,100 kW other than for aircraft, marine craft and locomotives

- ex 8411 81 Other gas turbines of a power not exceeding 5,000 kW other than for aircraft, marine craft and locomotives
- ex 8411 82 Other gas turbines of a power exceeding 5,000 kW other than for aircraft, marine craft and locomotives
- ex 8411 91 Parts of turbojets and turbopropellers for use other than for aircraft, marine craft and locomotives
- ex 8411 99 Parts of other gas turbines for use other than for aircraft, marine craft and locomotives
- ex 8413 50 Other reciprocating positive displacement oil well and oil field pumps
- ex 8413 60 Other rotary positive displacement oil well and oil field pumps
- ex 8413 91 Parts of oil well and oil field pumps and pumps used in petroleum refining
- ex 8414 80 Compressors for use in natural gas production and delivery, and for use in power plants
- ex 8414 90 Parts of compressors for use in natural gas production and delivery and in power plants in 8414.80
- 8416 10 Furnace burners for liquid fuel
- 8416 20 Other furnace burners, including combination furnace burners
- 8416 30 Mechanical stokers, including their mechanical grates, mechanical ash dischargers, and similar appliances
- 8416 90 Parts of furnace burners
- ex 8417 80 Other nonelectric industrial or laboratory furnaces and ovens, including incinerators, for waste-to-energy production
- ex 8417 90 Parts of other nonelectric industrial or laboratory furnaces and ovens, including incinerators, for waste-to-energy production
- ex 8419 19 Solar water heaters (hot water)
- ex 8419 40 Distilling and rectifying plant for petroleum refining, coal gasification, or biomass distillation
- ex 8419 60 Machinery for liquefying natural gas
- ex 8419 89 Other machinery, plant or equipment for refining petroleum, coal gasification, or fermenting biomass

- ex 8419 90 Parts of solar water heaters (hot water), and of distilling and rectifying plant for petroleum refining, coal gasification, or biomass distillation, machinery for liquefying natural gas, or other machinery, plant or equipment for refining petroleum, coal gasification, or fermenting biomass
- ex 8421 21 Water filtering or purifying machinery for boiler water for power generation
- ex 8421 29 Oil-separation equipment
- ex 8421 39 Gas separation equipment; filtering or purifying machinery and apparatus for use in the production of electricity from nuclear power
- ex 8421 99 Parts of machinery for filtering or purifying boiler water for power generation, oil-separation equipment, and gas separation equipment; filtering or purifying machinery and apparatus for use in the production of electricity from nuclear power
- 8428 31 Other continuous-action elevators and conveyors, for goods or materials, specifically designed for underground use
- 8428 32 Other continuous-action elevators and conveyors, for goods or materials, bucket type
- 8428 33 Other continuous-action elevators and conveyors, for goods or materials, belt type
- 8428 39 Other continuous-action elevators and conveyors, for goods or materials, other
- 8428 50 Mine wagon pushers, locomotive or wagon traversers, wagon tippers and similar railway wagon handling equipment
- 8428 90 Other lifting, handling, loading or unloading machinery of a kind used in charging or discharging furnaces; other lifting, handling, loading or unloading machinery of a kind used for radioactive materials; sidebooms and pipehandlers; loaders, underground mine type; other lifting, handling, loading or unloading machinery for oil and gas field machinery
- 8429 11 Self-propelled bulldozers and angledozers, track laying
- 8429 19 Self-propelled bulldozers and angledozers other than track laying
- 8429 20 Self-propelled graders and levelers
- 8429 30 Self-propelled scrapers
- 8429 51 Self-propelled front-end shovel loaders
- 8429 52 Self-propelled machinery with a 360 degree revolving superstructure
- 8429 59 Self-propelled backhoes, shovels, clamshells and draglines and other machinery other than with a 360 degree revolving superstructure
- 8430 10 Pile-drivers and pile-extractors

- 8430 31 Self-propelled coal or rock cutters and tunneling machinery
- 8430 39 Coal or rock cutters and tunneling machinery, not self-propelled
- 8430 41 Self-propelled boring or sinking machinery
- 8430 49 Offshore oil and natural gas drilling and production platforms; other boring or sinking machinery, not self-propelled, for oil well and gas field drilling; other boring or sinking machinery, not self-propelled, other
- ex 8430 50 Self-propelled peat excavators; self-propelled machinery for working earth, nesi
- 8430 62 Scrapers, not self-propelled
- 8430 69 Machinery for working earth, not self-propelled, nesi
- 8431 39 Parts of other lifting, handling, loading or unloading machinery os subheadings 8428.31, 8428.32, 8428.33, 8428.39, 8428.50, and 8428.90
- 8431 41 Buckets, shovels, grabs and grips suitable for use solely or principally with the machinery of headings 8426, 8429, or 8430
- 8431 42 Bulldozer or angledozer blades suitable for use solely or principally with the machinery of heading 8426, 8429 or 8430
- 8431 43 Parts of boring or sinking machinery of 8430.41 or 8430.49
- 8431 49 Parts suitable for use solely or principally with the machinery of heading 8429 or 8430, nesi
- ex 8437 80 Cutters and other machinery for working corn/biomass for biomass energy production
- ex 8437 90 Parts of cutters and other machinery for working com/biomass for biomass energy production
- 8467 11 Rock drills, pneumatic, hand-held rotary type (including combined rotary-percussion)
- ex 8467 19 Other tools for working in the hand, hydraulic or with self-contained nonelectric motor, other than pneumatic, designed for use in construction or mining
- ex 8467 92 Parts of pneumatic, hand-held rock drills or hand -held tools,hydraulic or with self-contained nonelectric motor, other than pneumatic, designed for use in construction or mining
- 8474 10 Sorting, screening, separating or washing machines
- 8474 20 Crushing or grinding machines
- 8474 80 Machinery for agglomerating, shaping, or molding soild mineral fuels, ceramic pastes, unhardened cements, plastering materials or other mineral products in powder or paste form

- ex 8474 90 Parts of machines for sorting, screening, separating or washing, crushing or grinding
- ex 8479 89 Oil and gas field wireline and downhole equipment
- ex 8479 90 Parts of oil and gas field wireline and downhole equipment
- ex 8481 10 Pressure-reducing valves for electric power generation, petroleum and natural gas production, petroleum refining, and biomass production
- ex 8481 30 Check valves for electric power generation, petroleum and natural gas production, petroleum refining, and biomass production
- ex 8481 40 Safety or relief valves for electric power generation, petroleum and natural gas production, petroleum refining, and biomass production
- ex 8481 80 Hand operated valves and other valves for electric power generation, petroleum and natural gas production, petroleum refining, and biomass production
- ex 8481 90 Parts valves for electric power generation, petroleum and natural gas production, petroleum refining, and biomass production
- ex 8501 31 Other electric DC motors, of an output exceeding 74.6 W but not exceeding 735 W
- ex 8501 32 Other electric DC motors of an output exceeding 750 W but not exceeding 75 kW, other than electric motors of a kind used as the primary source of mechanical power for electrically vehicles of subheading 8703.90 and other than for use in civil aircraft
- ex 8501 33 Other electric DC motors of an output exceeding 75 kW but not exceeding 375 kW, other than for use in civil aircraft
- ex 8501 34 Other electric DC motors of an output exceeding 375 kW
- ex 8501 51 Other AC motors, multi-phase, of an output exceeding 74.6 W but not exceeding 735 W
- ex 8501 52 Other AC motors, multi-phase, of an output exceeding 750 W but not exceeding 75 kW, other than for use in civil aircraft
- ex 8501 53 Other AC motors, multi-phase, of an output exceeding 75 kW but under 149.2 kW, or of an output exceeding 150 kW
- 8501 64 AC generators (alternators) of an output exceeding 750 kVA
- 8502 13 Generating sets with compression-ignition internal combustion piston engines (diesel or semi-diesel) of an output exceeding 375 kVA
- 8502 20 Generating sets with spark-ignition internal combustion piston engines
- 8502 31 Other generating sets, wind-powered
- 8502 39 Other generating sets

- ex 8503 00 Parts of generators for generators of subheadings 8501.64, 8502.13, 8502.20, 8502.31, and 8502.39
- 8504 21 Liquid dielectric transformers having a power handling capacity not exceeding 650 kVA for electric power delivery
- 8504 22 Liquid dielectric transformers having a power handling capacity exceeding 650 kVA but not exceeding 10,000 kVA for electric power delivery (electricity)
- 8504 23 Liquid dielectric transformers having a power handling capacity exceeding 10,000 kVA
- 8504 33 Other transformers having a power handling capacity exceeding 16 kVA but not exceeding 500 kVA
- 8504 34 Other transformers having a power handling capacity exceeding 500 kVA for electric power delivery
- ex 8504 40 Speed drive controllers for electric motors and other static converters (including rectifiers and rectifying apparatus and inverters), other than for power supplies for automatic data processing machines or units thereof of heading 8471, or telecommunications apparatus
- ex 8504 90 Parts of speed drive controllers for electric motors and other static converters (including rectifiers and rectifying apparatus and inverters), other than for power supplies for automatic data processing machines or units thereof of heading 8471, or telecommunications apparatus
- 8507 20 Other lead-acid batteries, other than of a kind used as the primary source of electrical power for electrically powered vehicles of subheading 8703.90, including 6 V, 12 V, or 36 V
- 8507 40 Nickel-iron storage batteries, other than of a kind used as the primary source of electrical power for electrically powered vehicles of subheading 8703.90
- 8532 25 Electrical capacitors, fixed, variable or adjustable (pre-set), dielectric of paper or plastics, alternating current (AC) service, 1,000 V or greater
- 8535 10 Fuses for a voltage exceeding 1,000 V
- 8535 21 Automatic circuit breakers for a voltage of less than 72.5 kV
- 8535 29 Automatic circuit breakers for a voltage greater than 72.5 kV
- 8535 30 Isolating switches and make-and-break switches
- ex 8535 90 Motor starters and motor overload protectors
- 8536 10 Fuses, for a voltage not exceeding 1,000 V
- 8536 20 Automatic circuit breakers, for a voltage not exceeding 1,000 V

- 8536 30 Other apparatus for protecting electrical circuits, including motor overload protectors, for a voltage not exceeding 1,000 V
- 8536 41 Relays for a voltage not exceeding 60 V
- 8536 49 Relays for a voltage greater than 60 V, but not exceeding 1,000 V
- 8536 50 Switches for a voltage less than 1,000 volts
- 8536 69 Electrical connectors
- 8536 90 Other apparatus, including terminals, boxes
- ex 8537 10 Motor control centers, switchgear assemblies and switchboards, panel boards and distribution boards, and programmable controllers and associated modules
- 8537 20 Boards, panels, consoles, desks, cabinets and other bases, for a voltage exceeding 1,000 V
- 8538 10 Parts of boards, panels, consoles, desks, cabinets and other bases, not equipped with their apparatus, for a voltage exceeding 1,000 V
- 8538 90 Parts suitable for use solely or principally with the apparatus of headings 8535.10, 8535.21, 8535.29, 8535.30, and motor starters and motor overload protectors; of headings 8536.10, 8536.20, 8536.30, 8536.41, 8536.49, 8536.50, and motor control centers, switchgear assemblies and switchboards, panel boards and distribution boards, and programmable controllers and associated modules; of headings 8537.20 and 8538.10
- ex 8541 40 Photovoltaic cells (solar cells), whether or not assembled in modules or made up into panels
- ex 8544 41 Other electric connectors, for a voltage not exceeding 80 V, fitted with connectors, other than of a kind used for telecommunications
- ex 8544 49 Other electric connectors, for a voltage not exceeding 80 V, other than fitted with connectors, other than of a kind used for telecommunications
- ex 8544 51 Other electric connectors, for a voltage exceeding 80 V but not exceeding 1,000 V, other than fitted with modular telephone connectors and other than a kind used for telecommunications
- 8544 60 Other electric conductors, for a voltage exceeding 1,000 V
- 8546 20 Electrical insulators of ceramics, used in high-voltage, low-frequency electrical systems, commonly known as suspension, pin-type or line post insulators
- ex 8547 90 Electrical conduit tubing and joints therefor, of base metal lined with insulating material, for electric power delivery
- 8704 10 Dumpers designed for off-highway use

- ex 8705 20 Mobile drilling derricks for oil and gas
- 8905 20 Floating or submersible drilling or production platforms
- 9015 80 Seismographs and geophysical instruments and appliances
- 9015 90 Parts of seismographs and geophysical instruments and appliances
- 9026 10 Electrical instruments and apparatus for measuring or checking the flow or level of liquids
- 9026 20 Electrical instruments and apparatus for measuring or checking the pressure of liquids or gases
- 9026 80 Other instruments and apparatus for measuring or checking variables of liquids or gases, nesi
- 9026 90 Parts and accessories of instruments and apparatus for measuring or checking variables of liquids or gases
- 9028 10 Gas supply or production meters, including calibrating meters
- 9028 20 Liquid supply or production meters, including calibrating meters
- 9028 30 Electricity supply or production meters including calibrating meters
- 9028 90 Parts and accessories for gas, liquid, or electricity supply or production meters
- 9030 39 Instruments and apparatus, nesi, for measuring or checking electrical voltage, current, or resistance
- ex 9032 10 Thermostats for articles of headings 8402, 8403, 8404, and 8416
- ex 9032 20 Manostats for articles of headings 8402, 8403, 8404, and 8416
- ex 9032 81 Hydraulic and pneumatic instruments and apparatus for articles of headings 8402, 8403, 8404, and 8416
- ex 9032 89 Process control instruments and apparatus
- ex 9032 90 Parts of process control instruments and apparatus of heading 9032.89

ENERGY SECTOR SERVICES

A. Oil & Gas Field Services

1. Exploration. Exploration includes collecting scientific data through gravity, magnetic, seismic and geologic methods to assess the earth's subsurface characteristics and intimate the presence of oil and gas reserves. Governments through production sharing contracts or royalty/tax regimes often offer areas of exploration. Other services also are provided, such as exploration and production information systems, software and computer modeling services to help petroleum companies find, produce and manage oil and gas reservoirs.
2. Drilling. Drilling is the process of creating a well to locate and recover oil and gas. Drilling is often referred to as the production phase. Drilling is accomplished by using many specialized industry-specific contractors with unique equipment and services. These contractors include drilling, mud, downhole tools, logging, cementing, testing, stimulation and completion.
3. Processing, Gathering & Refining. This is the process of isolating saleable products from a mixed raw production stream. For example, crude oil is isolated from water and gas, or gas is isolated from water, hydrocarbon liquids and other inert gases. Gathering occurs by gathering oil or gas from a group of wells to isolate saleable products and at a larger level where these saleable products are distributed by pipeline, barge, etc. to a market. Gas also is gathered as coal bed methane and land fill methane, processed, stored and injected into the pipeline transmission system. Crude oil is processed at refining installations into a number of refined products, such as lubricants, fuels and gasoline. Other services under this heading include evaluation of producing formulations, production enhancement and well maintenance services.
4. Design & Engineering. Extensive specialized design, engineering, procurement and construction services are required in building production processing equipment, pipelines and gathering systems. In offshore situations there is also the matter of designing and construction platforms, processing equipment and gathering systems.
5. Production (Construction, Operation & Maintenance). This includes workover rigs and associated support services, which are similar to drilling listed above, except that these workover rigs are generally more specialized using different equipment. Operation and maintenance includes the support technical personnel, chemicals and service equipment to continuously process the oil and gas.
6. Transportation. Pipelines, barges, ships and trucks typically move oil, and pipelines typically move natural gas. Movement is from the production area to market locations such as refineries for oil and power plants and local distribution companies for natural gas. Natural gas also can be converted to liquified form and transported in specially designed ships to port facilities where it is regasified and transported through pipelines to market locations.
7. Storage. Crude oil is stored in large tanks at atmospheric pressure and temperatures. Natural gas can be stored in liquified form in specialized tanks or as compressed vapor in underground reservoirs.
8. Trading, Marketing & Brokering. In the oil and gas field services sector, these activities vary greatly depending on the location of the production vis-a-vis the market. They include working with transporters (ships, barges, pipelines and trucks) and major users (refiners, power plants and industries) to arrange long-term contracts.

9. Support Services. These include analysis of rock and other production field samples in order to access the commercial viability of a field. These tests and their results enhance competition and stimulation designs.
10. Waste Management & Disposal. This is a key concern and includes disposing of produced water, drill cuttings, drilling fluids and spent process fluids.

B. Electricity Services.

1. Design & Engineering. This includes the selection of the configuration of a power plant, transmission system, substations, and various other equipment. Also included is the use of technology such as gas-fired or steam turbines, fluidized beds, or wind, solar or other renewable energy technologies. Design and engineering services can be greatly affected by requirements to include in-country materials or in-country design mandates. Design and engineering services also include all customary development work, such as acquiring all necessary permits and approvals, and contracts for fuel, transportation and other supplies.
2. Generation (Construction, Operation & Maintenance). This includes actual construction of the facility, start-up services, training of personnel, safety and security of personnel, material fabrication and installation, equipment financing, and equipment and construction warranties. Operation and maintenance services include the actual operation and maintenance of the facility as well as financial and management services, environmental and safety safeguards, periodic equipment replacements and upgrades, and efficiency programs. Included in the operation category are fuel procurement services, acquisition of spare parts, and preventative and periodic maintenance.
3. Transportation. Transportation in the electricity service sector involves the movement of electricity along high voltage transmission lines. Additional services in this area include control room services of the central network, scheduling of electricity transmission, provision of ancillary services (such as, load following, stability services, reactive power, and spinning reserves), and access to the transmission system. These services also include the operation and maintenance of the transmission lines and upgrading of these lines based on advancements in technology.
4. Distribution. Distribution involves transporting electricity from high voltage lines to low voltage lines, including associated transformer and substation facilities, for delivery to end-use customers. These are the lines that are customarily seen in residential areas to deliver electricity to consumers. Additional services in this area include the repair and maintenance of distribution lines and facilities, response to customers' needs, installation of additional lines, up grades of lines and facilities, and installation of service to additional customers.
5. Storage. Unlike most commodities, electricity can not be stored economically except for the use of certain solar and fuel cell technologies. These services include the use of technologies for supplementing energy during peak hours or at the time other technologies are not available. Electricity, however, can be effectively "stored" by trading or swapping electricity for natural gas or other energy services during emergency, peak-load, or other high-cost hours. These services are highly specialized and case-specific and allow the various energy services to be substituted for each other in order to maximize efficiency and increase profitability.
6. Trading, Marketing & Brokering. These services include the buying and selling of electricity and electricity services for resale or for delivery to the ultimate customer, and the arrangement of transactions among buyers and sellers of these services. An electricity trader or marketer will buy (take title to) the electricity and take the risk that the electricity can be used or sold to another party.

An electricity trader will also aggregate supplies of electricity and provide customers with custom fit services to meet their individual needs. Traders also arrange for the transportation of electricity to end-use customers. Brokers do not buy (take title to) electricity services but arrange transactions for buyers and sellers. They also may aggregate supplies and purchasers in order to take advantages of economies of scale involved in large volume transactions.

7. Commodity & Price Risk Management. These services include the providing of calls, puts, swaps, options and commodity price risk management tools whose underlying values are attached to the price of electricity. Even though these services are utilized by businesses worldwide, they can involve activities that may be prohibited under certain jurisdiction anti-gaming laws, because they are not tied directly to a physical commodity. The development of these services enhances the efficient operation of electricity markets by providing price discovery and price risk management tools to those dealing in the underlying physical commodity. These services also can lead to substantial benefits in the deployment of capital in the industry and improve economic efficiency.
8. Demand-Side & Other Customer Services. These include programs to reduce or restructure a customer's consumption of electricity in order to conserve electricity, shape overall consumption patterns, and enhance the efficiency of the production and delivery system. These services include energy audits, replacement or up grades of existing customer equipment, and other efficiency and conservation services that help an end-use customer manage the efficient use of electricity. These also include metering and billing services.
9. Waste Management & Disposal. This involves the handling and disposal of the residue from the combustion phase of electricity generation (coal ash, solid particulates, etc.). Other aspects include include pollution control services such as fuel gas stack scrubbers, particulate reduction, and water treatment and disposal.

C. Natural Gas Services.

1. Design & Engineering. Extensive specialized design, engineering, procurement and construction services are required in building natural gas production facilities, processing equipment, pipelines and gathering systems. In offshore situations there is also the matter of designing and construction platforms, processing equipment and gathering systems. These services also include the design and operation of information and communication equipment to facilitate communication between field and market participants (such as trading floors).
2. Processing & Gathering. This is the process of isolating saleable products from a mixed raw production stream. For example, natural gas is isolated from water, hydrocarbon liquids and other inert gases. Gathering occurs by gathering gas from a group of wells or from coal bed methane seams or land fills to isolate saleable products and at a larger level where these saleable products are distributed by pipeline to market. Natural gas also can be liquified for transportation by specially designed cargo ships to port facilities where it is regasified and injected into pipeline systems for transportation to markets.
3. Transportation. Pipelines typically move natural gas from gathering and processing facilities, or from liquified natural gas regasification facilities, to local distribution entities and end-use markets. Additional services in this area include the repair and maintenance of pipelines and associated equipment, response to customers' needs, management training, installation, up grade and expansion of pipelines, meters, storage and compression equipment, and installation of service to additional customers.

4. Distribution. Natural gas service is provided to end-use customers by a local distribution entity, which transports the gas from the high pressure transportation pipeline to consumers through lower volume and pressure pipelines. Additional services in this area include the repair and maintenance of mains, response to customers' needs, management

training, installation of additional mains, meters, storage, compression and end-use equipment, and installation of service to additional customers.

5. Storage. Natural gas can be stored in liquified form in specialized tanks or as compressed vapor in underground reservoirs. Storage services help coordinate gas supply and consumption patterns, thereby increasing the efficiency of the gas production, transportation, distribution and end-use system.
6. Demand-Side & Other Customer Services. These include programs to reduce or restructure a customer's consumption of natural gas in order to conserve natural gas, shape overall consumption patterns, and enhance the efficiency of the production and delivery system. These services include energy audits, replacement or up grades of existing customer equipment, and other efficiency and conservation services that help an end-use customer manage the efficient use of natural gas. These also include metering and billing services.
7. Trading, Marketing & Brokering. These services include the buying and selling of natural gas services for resale or for sale to the ultimate customer, and the arrangement of transactions between buyers and sellers of natural gas. A gas trader or marketer will buy natural gas and take the risk that the gas can either be used or resold to another party. A trader also will aggregate supplies of gas and provide customers with natural gas supplies and services that are custom fit to the consumer's needs. Traders also arrange for the transportation of gas to consumers. Brokers do not purchase natural gas supplies or services, but arrange transactions between buyers and sellers and also may aggregate suppliers and sellers in order to take advantage of large volume transactions.
8. Commodity & Price Risk Management. These services include the providing of calls, puts, swaps, options and commodity price risk management tools whose underlying values are attached to the price of natural gas. Even though these services are utilized by businesses worldwide, they can involve activities that may be prohibited under certain jurisdiction anti-gaming laws, because they are not tied directly to a physical commodity. The development of these services enhances the efficient operation of natural gas markets by providing price discovery and price risk management tools to those dealing in the underlying physical commodity. These services also can lead to substantial benefits in the deployment of capital in the industry and improve economic efficiency.

D. Mining and Mining Services

1. Exploration. Exploration services apply both advanced technologies including remote sensing from satellites and aircraft and physical surveys and sampling to pinpoint exact locations of mineral discovery. Drilling services are utilized at promising sites. Core sample testing services via chemical analysis, x-ray, microanalysis, and neutron activation analysis among others validate the mineral discovery. A wide range of commodities are mined including: coal, copper, iron, molybdenum, gold, phosphate, bauxite, zinc, lead, trona, limestone, silver, diamonds.
2. Regulatory Approvals and Environmental Permitting. Environmental engineering services are applied to thoroughly study the environmental characteristics and impacts of the proposed mine in areas including air quality, archaeological and cultural, groundwater modeling, noise, socioeconomic, surface water, wetlands, and other impacts. Environmental permitting specialists assist in

preparation of studies and documents to meet the various local, state and federal requirements. Public relations specialists communicate with the various publics involved in the process. Environmental specialists prepare plans to protect the environment throughout the mining process, during reclamation of the site and into perpetuity.

3. Development. Mine planning specialists design detailed customized plans for surface or underground mining. The plan details the flow of activity, positioning of all support structures and processes and definition of equipment to be utilized. A variety of services are utilized as structures are built, equipment is procured, a workforce is hired, management staff is appointed, training programs are developed and the operation prepares for start-up. Development may be performed directly by mine owners/operators or through specialized consultants and subcontractors in part or in entirety.
4. Extraction. In surface mining, the extraction process begins by removing any overburden down to the mineral level. Hard overburden and ores are drilled and blasted into fragments. The fragmented material is then loaded into transport vehicles or conveyors to carry it to a dumping or processing area. Crushing of the material may occur during the transport cycle as well as during processing of the ore. Waste rock and tailings are carefully managed throughout the operation of a mine. Mines generally operate 24 hours a day, 365 days a year, so planning for proper inspection, parts inventory management, maintenance, repair, lubrication and upgrading of equipment and haul roads to assure maximum productivity is critical. Activities may be undertaken by the mine staff or contracted.

If mineralization is deep beneath the surface, shafts or passageways are drilled in order to remove the ore and waste and provide ventilation. Various approaches to mining underground essentially cut the mineral from the walls and convey it back to the surface for loading into rail cars or trucks for transfer to processing. Various engineering disciplines are required to maximize the reserve recovery at the lowest economical cost.

5. Processing. Many minerals require separation from the rock in which they are found. The mineral may then require concentration, usually by crushing or grinding the material. Flotation processes, heap leaching or in situ processes may be used, depending on the mineral and the ore body configuration. In the case of coal, washing and blending to grade may be required. Various treatments for iron ores are required depending upon their use in final steelmaking. Waste products resulting from processing need to be disposed of in an environmentally responsible manner.
6. Production/Technology. To date, mature mining markets have increased their productivity and reduced their costs via mechanization. Mechanization has nearly reached its ceiling. Future enhancements will include the electronic/information systems which allow existing mechanical/hydraulic systems to communicate among themselves & optimize performance. Developing markets will be forced to compete on a cost basis in the future. Most likely, they will follow the trend of the mature markets (i.e. mechanization). Producing more product with fewer people will create difficult political, social & economical decisions for these countries.
7. Marketing. Coal mines establish contracts with utilities or sell coal on spot markets, while minerals are marketed to industrial processors or users, or in some cases, agricultural customers. - Hard rock mineral prices fluctuate relative to the commodities market. There is a trend in the coal market toward commodity market behavior due to deregulation/privatization of the utility industry.
8. Transportation. Coal and minerals are transported to processing facilities and ultimately to the marketplace for those commodities. Railroads, ore boats, conveyor belt lines and trucking are used

extensively. Aircraft may be used to transport others. In remote mines, transportation is provided to fly mine staff in and out of the property. Transportation of all equipment and resources to explore, develop, operate, service and reclaim a mine are also key considerations.

9. Reclamation. The modern mining industry is held accountable for protection of the environment. In most developed countries, reclamation is an integral and ongoing aspect of the mine plan of operation and independent laboratories administer tests to assure compliance. Consultants provide guidance. Environmental specialists work to meet all permitting requirements during mining operations and reclamation.
10. Recycling. Many mining companies have active recycling operations. Steel and lead in particular are successfully recovered at plants designed specifically for those purposes.
11. Engineering. Design of the equipment and infrastructure to explore, extract, process and transport minerals along with the design of mine plans which utilize this equipment optimally is an extremely challenge task. The history of mining in the world is that the easiest reserves are always mined first. Future mining will include more difficult mining conditions, lower quality minerals/ores and more stringent regulatory requirements. In part, this will be accomplished successfully with improvements in engineering design/approaches.

Service Summary - The mining industry is supported by a wide variety of equipment and service suppliers including: mining equipment and consumables, processing equipment, support equipment and maintenance services, mining subcontractors, chemicals and explosives, technical support services, engineering services, environmental services, MIS services, human resources and infrastructure, international trading and governments, power generation and infrastructure.

Illustrative List of Environmental Goods	HS	HS description
<u>Air Pollution Control</u>		
Particulate emissions collectors (particulate: a particle of solid or liquid matter) bins, tanks, silos, blowers, multi-stage blowers, classifiers, cartridge dust collectors, bag dust collectors, bag filters, drum filters, filter receivers, hepa filters, dry filters, wet filters, magnets, bag dump stations	7019.90 7309.00 7310.00 7610.90 8414.80 8421.31 8421.39	Glass fiber filters Reservoirs, tanks, and vats for any material, of a capacity exceeding 300 liters Tanks, casks, drums, cans, boxes or iron or steel Other, aluminum structures; aluminum plates, rods, profiles, tubes and the like, prepared for use in structures Other, except parts, air or vacuum pumps, air or other gas compressors and fans; ventilating or recycling hoods Intake air filters for internal combustion engines Other, filtering or purifying machinery for gases
Gaseous emissions control systems and devices electrostatic precipitators (devices in which solid or liquid particulates in a gas stream are charged as they pass through an electric field and then caught on a collection surface), fume collectors	8402.11 8402.12 8402.19 8402.20 8402.90 8404.10 8404.20 8404.90 8421.39 8419.60 8419.89 9032.81	Steam generating boilers, exceeding 45 t per hour Steam generating boilers, not exceeding 45 t per hour Other vapor generating boilers Super heated water boilers Parts Auxiliary plant for use with boilers Condensers for steam or other vapor Parts Other, filtering or purifying machinery for gases Machinery for liquefying air or other gases Machinery for treatment of materials involving a change in temperature Other controlling instruments, hydraulic and pneumatic
Mobile Source Control equipment (mobile source: a moving producer of air pollution, mainly forms of transportation such as; cars, motorcycles, planes) Catalytic converters (air pollution abatement device that removes organic contaminants by oxidizing them into carbon dioxide and water through chemical reaction, but in this context are more commonly known as the devices used to reduce nitrogen oxide emissions from motor vehicles)	8421.39	Other, filtering or purifying machinery for gases
Monitoring/control systems (all the equipment required to measure and record all parameters as well as all control equipment)	9032.10 9032.20 9032.81 9032.89 9032.90 9033.00	Thermostats Controlling instruments, manostats Other controlling instruments, hydraulic and pneumatic Other, regulating or controlling instruments Parts and accessories, regulating or controlling instruments Parts and accessories, not specified, for regulating or controlling instruments
Gas separating equipment	8421.39	Other, filtering or purifying machinery for gases
Odor control equipment scrubbing systems	7610.90 8421.39 8424.90	Other, aluminum structures; aluminum plates, rods, profiles, tubes and the like, prepared for use in structures Other, filtering or purifying machinery for gases Parts, appliances for dispersing or spraying liquids or powders

Illustrative List of Environmental Goods	HS	HS description
Other air pollution control equipment bucket elevators, conveyors, cyclones, dampers, diverter valves, metal expansion joints, fabric expansion joints, axial fans, centrifugal fans, hoods and ducting	8414.90 8428.20 8428.32 8481.10 8481.30 8481.40 8481.80	Ventilating & recycling hoods Pneumatic elevators and conveyors Other, bucket types continuous action conveyers Pressure-reducing valves Check valves Safety or relief valves Other appliances, taps, cocks, valves
Waste Water Management		
Desalinization Equipment	8421.21	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water
Storage tanks and process vessels (Including pressure vessels) liquid level gauges, pressure gauges, storage tanks, high pressure rodders	7309.00 7310.10 7310.21 7310.29 7610.90 8901.90 9026.10 9026.20	Reservoirs, tanks, and vats for any material, of a capacity exceeding 300 liters Tanks or drums of a capacity of 50 liters or more Tanks or drums of a capacity of less than 50 liters Other containers Other, aluminum structures; aluminum plates, rods, profiles, tubes and the like, prepared for use in structures Other vessels for the transport of goods (water storage tanks) For measuring or checking the flow or level of liquids For measuring or checking pressure
Industrial separators (Including centrifuges) solids centrifuges, sludge centrifuges, oil and water separators, grease interceptors and concentrators	8421.19 8421.29 8421.91 8421.99	Other, centrifuges including filtering or purifying machine for liquid or gas Other, filtering or purifying machines for liquids Parts of centrifuges Parts for filtering or purifying water
Sampling equipment (Automated and manual) suspended solids monitoring equipment, multi-parameter monitoring systems, pH monitoring systems, flow meters, gas and liquid chromatographs, combustible/toxic gas detectors, carbon monoxide monitors, hydrocarbon detection monitors, hydrogen sulfide detection, dissolved oxygen meters, radioactivity monitors, rain gauges, water level recorders, bacterial respirometers, sludge thermometers, smoke testing equipment	9025.11 9025.19 9025.80 9026.10 9026.20 9026.80 9026.90 9027.10 9027.20 9027.30 9027.40 9027.50 9027.80 9028.10 9028.20 9031.49 9031.80	Thermometers and pyrometers, not combined with other instruments Other Other instruments For measuring or checking the flow or level of liquids For measuring or checking pressure Other measuring and checking instruments Instruments parts and accessories Instruments for analysis Electrophoresis instruments Spectrophotometers Exposure meters Instruments using optical radiations Other instruments and apparatus Gas meters Liquid meters Other optical instruments and appliances Other instruments, appliances, and machines

Illustrative List of Environmental Goods	HS	HS description
Fluid filters (Including housings) vacuum filters, beltpress filters, automatic backwash filters, biological filters, pressure filters, filtration sand, screens, screen rakes, coarse screens, disc water screens, drum wastewater screens, vibrating wastewater screens, screening accessories, pipe and suction strainers, micro strainers	8421.21 8421.29 8421.99	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids Other, centrifuges, including centrifugal dryers; filtering or purifying machinery for liquids and gases
Sewage treatment equipment <u>Sewer equipment:</u> compressors and blowers for sewage aeration, sewer cleanouts, sewer sliplining, sewer grouting, sewer rodding equipment, sewer cleaning equipment, sewer insecticides, sewer dye tracers <u>Sludge equipment:</u> sludge collectors, sludge shredders, sludge density and condition control equipment, sludge thickeners, sludge bed enclosures, sludge codisposal systems, sludge land spreading equipment, sludge dryers, sludge heaters, sludge incinerators, sludge reactors, sludge removal equipment, sludge solidification and fixation equipment, sludge weighing systems, sludge belt presses, pumber trucks for sludge removal <u>Other sewage equipment:</u> grit collection equipment, grit classifiers, grit washers, clarifiers, ultra-violet disinfection systems, dissolved air flotation clarification systems, elements to increase surface area for bacteria culture, disintegrators, choppers, feeders, high shear mixers, extruders, paddle dryers, rotary drum dryers, sectional coolers, flash dryers, tray dryers, conveyors, crushers, septage receiving systems, septic tanks, wastewater pond baffles, wastewater pond liners, wastewater drainage floors, wastewater irrigation equipment, spray nozzles, sequencing batch reactors, root control equipment, digesters: aerobic and anaerobic <u>Chemicals:</u> ferric chloride, ferrous chloride, ferric sulfate, ferrous sulfate (used for sludge conditioning, enhanced coagulation, odor control, corrosion)	5801.90 7304.31 7309.00 7310.10 7310.21 7310.29 7610.90 8410.00 8414.30 8414.80 8417.80 8423.81 8423.82 8423.89 8424.90 8426.20 8427.10 8479.82 8479.89 8481.80 8514.10 8514.20 8514.30 8514.40	Other woven pile fabrics and chenille fabrics Tubes/pipes for boilers, feedwater heaters, condensers Reservoirs, tanks, vats of iron or steel Tanks or drums of a capacity of 50 liters or more Tanks or drums of a capacity of less than 50 liters Other containers Other, aluminum structures; aluminum plates, rods, profiles, tubes and the like, prepared for use in structures Hydraulic turbines, water wheels, and regulators Compressors of a kind used in refrigeration, including air conditioning Other, except parts, air or vacuum pumps, air or other gas compressors and fans; ventilating or recycling hoods Other, except parts, industrial or laboratory furnaces and ovens, including incinerators Other weighing machinery, capacity not exceeding 30 KG Other weighing machinery, capacity exceeding 30 KG but not 5,000 KG Other, weighing machinery Parts, appliances for dispersing or spraying liquids or powders Tower cranes Self-propelled trucks powered by an electric motor (ie. pumper trucks for sludge removal) Mixing, kneading, crushing, grinding machines Other, electromechanical appliances with self-contained electric motor Other appliances, taps, cocks, valves Resistance heated furnaces and ovens Induction or dielectric furnaces and ovens Other furnaces and ovens Other induction or dielectric heating equipment
Pack tower aerators (Packed tower: A pollution control device that forces dirty air through a tower packed with crushed rock or wood chips while liquid is sprayed over the packing material. The pollutants in the air stream either dissolve or chemically react with the liquid.)	8479.89	Other, electromechanical appliances with self-contained electric motor
Deionization equipment ion selective analyzers, ion exchangers, selective ion electrodes	8543.89 9030.10	Other electrical machines and apparatus w/ individual functions Instruments and apparatus for measuring or detecting ionizing radiations
Pumps	8413.50 8413.60 8413.70 8413.81 8414.10	Other reciprocating positive displacement pumps Other rotary positive displacement pumps Other centrifugal pumps Other pumps, turbine pumps, windmill pumps Vacuum pumps
Metal removal/recovery Precipitation chemicals, automated treatment equipment		

Illustrative List of Environmental Goods	HS	HS description
Solid/liquid separation (not covered under municipal sewage sludge) filters, presses	8419.40	Distilling or rectifying plant
All other water and wastewater equipment trench less pipe technology, pipe camera systems, absorption equipment, rodent controls	7303.00 8419.89 8479.50 8525.30 8525.40 8543.89 9006.51 9006.52 9006.53 9006.59	Soil pipe Other machinery, plant, or laboratory equipment for the treatment of materials Industrial robots, not elsewhere specified or included Television cameras Still image video cameras and other video Other, electrical machines and apparatus, having individual functions Other cameras, with through-the-lens viewfinder Other, for roll film of a width less than 35 mm Other, for roll film of a width of 35mm Other
Solid/Hazardous Waste Management		
	7309.00 7310.00 7610.90 8430.50 8430.60 8431.41 8431.42 8417.10 8417.80 8417.90 8479.82 8479.89 8514.10 8514.20 8514.30 8705.90	Solid waste equipment storage containers (including metal and concrete), incinerators (including steel and concrete), compactors, conveyors, shredding machinery, bailing machinery, vehicles: tank trucks, dump trucks, other trucks
Spill clean-up and containment equipment Gas management equipment	6810.99 7806.00	Other, articles of cement, of concrete, or of artificial stone Other articles of lead
Pit and landfill liners		
Truck bodies		
Gas management equipment		

Illustrative List of Environmental Goods	HS	HS description
<u>Remediation/Clean-up of Soil and Water</u>		
Air sparaging equipment (This process extends the effectiveness of soil vapor extraction to include contaminants that exist in groundwater. The equipment is used to pump air into contaminated site below the saturation level, rising air bubbles trap contaminants and take them up for collection and treatment.)	8421.39	Other, filtering or purifying machinery and apparatus for gases
Bio remediation Oxygen release compound - used to allow bio remediation of dissolved petroleum hydrocarbons (bio remediation - the process of oxygenating a substance to make it non-toxic)	5911.90	Other, textile products and articles, for techncial uses
Biofiltration equipment (Concerns the use of plants, bacteria or other microorganisms to filter wastewater or polluted)	8421.21 8421.39 8421.99	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, machinery or apparatus for filtering or purifying gases Other, centrifuges, including centrifugal dryers; filtering or purifying machinery for liquids and gases
Dry sieves	8421.29	Other, filtering or purifying machinery or apparatus for liquids
Dry sieve separation	8421.21 8421.29 8421.39	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids Other, machinery or apparatus for filtering or purifying gases
Dual phase extraction (Combines soil vapor extraction and ground water extraction by using a ground water extraction trench around the polluted area, while a soil vapor extraction apparatus is introduced to treat areas with the highest pollutant levels.)	8421.21 8421.29	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids
Critical fluid extraction	8421.21 8421.29	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids
Foam Separation (Equipment such as film filters used to separate the foam that rises to the top of wastewater or slurries in processing.)	8421.21 8421.29	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids
Geo textiles		
Geophysics characterization (Equipment used to determine the chemical and physical characteristics of a site.)	9027.10 9027.20 9027.30 9027.40 9027.50 9027.80	Gas or smoke analysis apparatus Gas, liquid, and other chromatographs Spectroscopes, spectrophotometers, spectrometers Exposure meters Other instruments and apparatus using optical radiations Other instruments and apparatus

Illustrative List of Environmental Goods	HS	HS description
In situ flushing equipment (water, steam) (Equipment used in the process of flooding contaminated soil with a solution that moves the contaminants to an area where they are removed. "In situ" meaning in place refers to treating the soil without digging it up and removing it.)		
In situ vitrification equipment (Equipment used in the process of heating contaminated soil in place to chemically and physically change contaminants into a benign form, used for the stabilization of radioactivity contaminated soils. Alternating current (AC) or radio frequency (RF) equipment can be used in this process.)	8421.21 8421.29	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids
Infrared thermal destruction equipment (Equipment that is employed in the process of destroying contaminants in soil or groundwater through heating with infrared light.)	8516.29 9013.20	Soil heating apparatus Lasers
Incinerators (Any furnace used in the process of burning waste for the primary purpose of reducing the amount of waste by removing combustible matter. Also includes devices using controlled flame combustion, the primary purpose of which is to thermally break down hazardous waste.) Rotary kiln incinerator, fluidized bed incinerator, liquid injection incinerator and others.	8421.29 8417.80 8417.90 8419.19 8514.10 8514.20 8514.30 8514.40	Other, filtering or purifying machinery or apparatus for liquids Other, except parts, industrial or laboratory furnaces and ovens, including incinerators Parts, industrial or laboratory furnaces and ovens, including incinerators Other, instantaneous or storage water heaters, nonelectric Resistance heated furnaces and ovens Induction or dielectric furnaces and ovens Other furnaces and ovens Other induction or dielectric heating equipment
Liners/membranes		
Low temperature thermal distortion equipment	8543.89	Other machines having individual function not specified elsewhere
Intrinsic remediation equipment (Also called natural attenuation allows natural contaminant degradation to occur through biogradation. The process can be accelerated by adding oxygen to the system.)	2521.00 8543.89	Limestone Other, electrical machines and apparatus having individual functions
Land farming equipment (Equipment used to remove contaminated soil for treatment.)	8429.19 8429.20 8429.30 8429.40 8429.51 8429.52 8429.59	Other, bulldozers and angledozers Graders and levelers Scrapers Tamping machines and road rollers Mechanical shovels, excavators and shovel loaders Machinery with a 360° revolving superstructure (backhoes, shovels, clamshells, & draglines) Other
Leak prevention equipment (Any equipment used to prevent leaks in any kind of containment facility, most commonly refers to liners used in landfills and wastewater treatment facilities.)	8479.89	Other, electromechanical appliances with self-contained electric motor

Illustrative List of Environmental Goods	HS	HS description
Membrane filtration equipment (Amy use if membranes to separate out contaminants from wastewater.)	8421.21 8421.29 8421.39	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids Other, filtering or purifying machinery and apparatus for gases
Metal fixation equipment		
Microfiltration equipment (More selective membrane filtration that filters out smaller particles of pollutants.)	8421.21 8421.29 8421.39	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids Other, filtering or purifying machinery and apparatus for gases
Photocatalytic oxidation equipment (Use of sunlight for detoxification and disinfection. The process is accelerated by the use of semiconductor catalysts.)	8419.39 8479.89 8543.89	Other, dryers Other, electromechanical appliances with self-contained electric motor Other, electric machines and apparatus not specified or included elsewhere in this chapter
Photothermal detoxification equipment (Equipment that employs the use of light to heat and destroy toxic contaminants.)	8543.89	Other, electric machines and apparatus not specified or included elsewhere in this chapter
Phytoremediation equipment (Materials employed to clean up contaminated soil and water through the use of plants and trees. Phytoextraction: plants take up metal contaminants in roots, stems, and leaves, then are harvested and incinerated or composted. Rhizofiltration: contaminated water collected from a site is brought to greenhouse site where it is filtered by root systems. Phytodegradation: plants break down organic pollutants.)	8543.89	Other, electric machines and apparatus not specified or included elsewhere in this chapter
Plasma arc vitrification equipment (Waste materials are fed into a sealed furnace and heated to extremely high temperatures. Organic pollutants are burned off and remaining solids turn into a glassy byproduct that can be resold.)	8543.89	Other, electric machines and apparatus not specified or included elsewhere in this chapter
Pneumatic fracturing equipment (Equipment used to increase the permeability of soil by injecting highly pressurized air into consolidated sediments that are contaminated. The increased permeability accelerates the removal of contaminants particularly by vapor extraction, biodegradation, and thermal treatment.)	8479.89 8543.89	Other, electromechanical appliances with self-contained electric motor Other, electric machines and apparatus not specified or included elsewhere in this chapter
Reductive photo-dechlorination equipment	8479.89 8543.89	Other, electromechanical appliances with self-contained electric motor Other, electric machines and apparatus not specified or included elsewhere in this chapter
Slurry walls (cutoffs)		
Soil vapor extraction equipment (Equipment used to extract contaminants from soil in vapor form.)	8421.21 8421.29 8421.39	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids Other, filtering or purifying machinery and apparatus for gases

Illustrative List of Environmental Goods	HS	HS description
Solvent extraction equipment (Equipment used to separate hazardous contaminants from soils, sludges, and sediments.)	8421.21 8421.29	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids
Surfactant aide remediation		
Thermal oxidation equipment (Equipment used to treat waste in which the contaminated matter is mixed with air and then heated to high temperatures. the hydrocarbons oxidize to form carbon dioxide and water while other contaminants are scrubbed out later after being broke down.)	8479.89 8543.89	Other, electromechanical appliances with self-contained electric motor Other, electric machines and apparatus not specified or included elsewhere in this chapter
Thermal vacuum extraction equipment	8421.21 8421.29 8543.89	Filtering or purifying machinery or apparatus for liquids for filtering or purifying water Other, filtering or purifying machinery or apparatus for liquids Other, electric machines and apparatus not specified or included elsewhere in this chapter
Ultra-Violet oxidation equipment (Equipment used for a destructive process that combines the use of ultraviolet light (UV) and chemical oxidants, such as ozone and hydrogen peroxide to destroy organic and explosive contaminants in groundwater)	8479.89	Other, electromechanical appliances with self-contained electric motor
In situ biobarriers (Barriers used in place to contain and treat contaminated zones. Usually consist of a trench filled with some form of filtration material that collects contaminants as the groundwater filters through.)		
Vapor phase bioreactors (Bioreactors or "hot tubs" use engineered living cells as catalysts to breakdown pollutants. The vapor phase bioreactors are used to treat air borne pollutants.)	8479.89	Other, electromechanical appliances with self-contained electric motor
Liquid phase bioreactors (Same idea as vapor phase bioreactors, but used to treat pollutants in a liquid form, ie. wastewater.)	8479.89	Other, electromechanical appliances with self-contained electric motor
<u>Noise/Vibration Abatement</u>		
Highway barriers	7306.90 8409.91 8409.99 8479.89	Other, tubes, pipes, and hollow profiles of iron or steel Industrial mufflers Other, parts suitable for use solely or principally with engines of heading 8407 or 8408 Other, electromechanical appliances with self-contained electric motor
<u>Monitoring/Analysis and Assessment</u>		
Freezers and refrigerators		

Illustrative List of Environmental Goods	HS	HS description
Microtomes (Laboratory equipment used for cutting sections to prepare specimens for microscopic analysis.)	9027.90	Microtomes, parts and accessories
Laboratory separators (Including centrifuges)	8421.19 8421.29 8421.91	Other, centrifuges including filtering or purifying machine for liquid or gas Other, filtering or purifying machinery or apparatus for liquids Parts of centrifuges
Chromatography (Including gas, liquid, and other)	9027.20	Gas, liquid, and other chromatographs
Mass spectrometers	9027.30	Spectroscopes, spectrophotometers, spectrometers
Level and flow leak detector and sensors		
Industrial process monitoring devices Instruments and apparatus for measuring or checking flow, level, pressure, or other variables of liquids or gases	9026.10 9026.20 9026.80 9026.90 9032.20 9032.81	For measuring or checking the flow or level of liquids For measuring or checking pressure Other instruments or apparatus Parts and accessories Manostats Other instruments or apparatus
Radiation detection devices	9030.10	Instruments and apparatus for measuring or detecting ionizing radiations
Flow measurement devices	9026.10 9026.20 9026.80	For measuring or checking the flow or level of liquids For measuring or checking pressure Other instruments or apparatus
Gas detectors	9027.10	Gas or smoke analysis apparatus
Continuing supply devices		
Other scientific and analytic instruments	9032.81 9032.89	Other instruments or apparatus Other, automatic regulating or controlling instruments and apparatus
<u>Potable Water Treatment</u>		
Boiler Materials iron reduction equipment, lime softening equipment, chlorine dioxide generators, chlorine leak monitors, chlorine residual monitors, fluoridation equipment, nitrate monitors, manganese reduction equipment, boron removal equipment	8419.89 8479.89 8548.10	Other machinery, plant, or laboratory equipment for the treatment of materials Other, electromechanical appliances with self-contained electric motor Waste and scrap of primary cells, primary batteries, and electric storage batteries

Illustrative List of Environmental Goods	HS	HS description
Compounds boiler compounds, cooling tower compounds, all other water and wastewater compounds		
Chemicals chlorine, iodine, bromine, ozone gas		
Other treatments hydrogen sulfide removal process, ultraviolet light irradiation		
<u>Other Recycling Systems</u>		
Recycling	8422.20 8474.20 8474.90 8477.80 8477.90 8479.82 8479.90	Machinery for cleaning and drying bottles Crushing or grinding machines (ie. shredders to recycle glass) Parts, machinery for sorting, screening, separating, washing, crushing, grinding, mixing or kneading (ie. parts of shredders to recycle glass) Other machinery, machinery for working rubber or plastics (ie. shredders to recycle plastic) Parts of other machinery, machinery for working rubber or plastics (ie. parts of shredders to recycle plastic) Mixing, kneading, crushing, grinding, screening sifting, homogenizing, emulsifying or stirring machines having individual functions, not specified elsewhere in chapter (ie. parts of shredders oil filters to get the oil out and recover metal) Parts for machines having individual functions, not specified elsewhere in chapter (ie. parts of shredders oil filters to get the oil out and recover metal)
<u>Renewable Energy Plant</u>		
Residential/Commercial/Industrial solar collectors (Including active and passive)	8413.60 8419.11 8419.19 8541.40	Solar electric pump motors Heat recovery systems Solar water heaters Photosensitive semiconductor devices
Wind energy conversion equipment turbines, turbine sets, windmills, parts	8413.81 8502.31	Windmill pumps Wind powered generating units
Other turbines hydroturbines	8410.11 8410.12 8410.13 8410.90	Hydraulic turbines and water wheels, of a power not exceeding 1,000 kw Hydraulic turbines and water wheels, of a power exceeding 1,000 kw but not exceeding 10,000 kw Hydraulic turbines and water wheels, of a power exceeding 10,000 kw Parts, including regulators
Residential photovoltaics	8541.40	Photosensitive devices
Industrial wood fired boiler		
Methanol (Including natural and synthetic)		

Illustrative List of Environmental Goods	HS	HS description
Ethanol		
<u>Heat/Energy Management</u>		
Heat exchangers (devices that transfer heat from one fluid to another without allowing them to mix, both industrial and nuclear)	8415.83 8418.61 8419.11 8419.50 8479.60	Heat exchangers Compression type units whose condensers are heat exchangers Heat recovery system Parts, air conditioning machines Evaporative air coolers

Notes: This illustrative list is based on the OECD Framework described in the sectoral proposal for the Environmental Goods and Services Sector.

Illustrative List of Environment Services

Div.	Sub.	Title
54		Construction Services
	54342	Septic system installation services
	54650	Insulation services
61		Wholesale trade Services
62		Retail Trade Services
	***76	Cleaning materials
	***87	Other industry specific machinery and equipment and related operating supplies
	***89	Other machinery and equipment n.e.c.
	***95	Waste & scrap & other material for recycling
64		Land Transportation Services under various modes, e.g., by rail, road
65		Water Transportation Services under various modes, e.g., by sea
	65219	Other coastal & transoceanic water transport of freight
	65229	Other inland water transport services of freight
69		Various Distribution Services
	69210	Water, except steam & hot water, distribution services through mains
81		Research & Development Services
	81130	Research & Development Services in engineering and technology
	81190	Research & Development Services in other natural sciences
	81300	Interdisciplinary research & experimental development services
83		Other Professional, Scientific and Technical services
	83131	Environment consulting services
	83399	Other engineering services, other projects
	83520	Subsurface surveying services
	83530	Surface surveying services
	83561	Composition & purity testing & analysis services
86		Production services, on a fee or contract basis
	86222	Services incidental to water supply
	86590	Installation services of other goods

Div.	Sub.	Title
	86931	Metal waste & scrap recycling services
	86932	Non-metal waste & scrap recycling services
87		Maintenance & Repair Services
	87159	Maintenance & repair services of machinery & equipment n.e.c.
94		Sewage & Refuse Disposal, Sanitation & Other Environmental Protection Services
	94110	Sewage treatment services
	94120	Tank emptying & cleaning services
	94211	Non-hazardous waste collection services
	94212	Non-hazardous waste treatment & disposal services
	94221	Hazardous waste collection services
	94222	Hazardous waste treatment & disposal services
	94310	Sweeping & snow removal services
	94390	Other sanitation services
	94900	Other environmental protection services

Based on the Draft Central Product Classification (CPC) (Services Part, Sections 5-9) Version 1.0

Notes: 1. This list is not comprehensive, but illustrative.

2. CPC Version 1.0 provides further details on subclasses, i.e., short lists of services included and sometimes services excluded with cross-references to other parts of CPC Version 1.0.

3. This list is adapted from the document passed out by the Canadian Delegation at the APEC meetings in Penang in February 1998.